

10/634,742 filed 08/04/2003
Spaid et al.
Reply to Office Action of 08/16/2006

RECEIVED
CENTRAL FAX CENTER
NOV 16 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method for determining an interaction between a first plurality of molecules and a second plurality of molecules, comprising:
 - (a) flowing a plurality using pressure to flow a mixture of a first plurality of molecules and a second plurality of molecules in a fluidic conduit, the first plurality of molecules comprising a ligand, and the second plurality of molecules comprising a receptor;
 - (b) measuring the dispersion of at least one of the first plurality of molecules and the second plurality of molecules, wherein the dispersion of the molecules is Taylor-Aris dispersion,
and
 - (c) relating the dispersion to the determining an interaction between the plurality first plurality of molecules and the second plurality of molecules based on the dispersion measurement.
2. (canceled)
3. (currently amended) The method of claim 1, wherein the dispersion of the at least one of the first plurality of molecules and the second plurality of molecules in the mixture is compared with the dispersion of each of the first plurality of molecules and the second plurality of molecules in the absence of the other plurality of molecules.
4. (currently amended) The method of claim 1, wherein the dispersion is measured by detecting the concentration of the at least one of the first plurality of molecules and the second plurality of molecules in the fluidic conduit.
5. (currently amended) The method of claim 4, wherein the first and second pluralities of molecules are not labeled for detection.

10/634,742 filed 08/04/2003

Spaid et al.

Reply to Office Action of 08/16/2006

6. (original) The method of claim 1, wherein the interaction is an associative interaction.
7. (canceled)
8. (withdrawn) The method of claim 1, wherein the interaction is a dissociative interaction.
9. (canceled)
10. (currently amended) The method of claim 1, wherein a diffusivity ratio of ~~two~~ the first plurality of the molecules and the second plurality of molecules is at least about 2.
11. (currently amended) A method for determining an interaction between a first plurality of molecules and a second plurality of molecules, comprising:
 - (a) ~~introducing a first molecule of a~~ first plurality of molecules into a microfluidic conduit, the first plurality of molecules comprising an enzyme;
 - (b) ~~introducing a second molecule of the~~ plurality of molecules into the microfluidic conduit such that the second plurality of molecules contacts the first plurality of molecules, the second plurality of molecules comprising a substrate;
 - (c) measuring the dispersion of at least one of the first plurality of molecules and the second plurality of molecules flowing in the microfluidic conduit under pressure-driven flow conditions; and
 - (d) ~~relating the dispersion to the~~ determining an interaction between the first plurality of molecules and the second plurality of molecules based on the dispersion measurement.
12. (currently amended) The method of claim 11, wherein one of the first plurality of molecules and the second plurality of molecules is introduced into the microfluidic conduit in a continuous stream of fluid.

10/634,742 filed 08/04/2003

Spaid et al.

Reply to Office Action of 08/16/2006

13. (currently amended) The method of claim 11, wherein one of the first plurality of molecules and the second plurality of molecules is introduced into the microfluidic conduit in a bolus of fluid.

14. (currently amended) The method of claim 11, wherein the first and second pluralities of molecules are introduced simultaneously.

15. (currently amended) The method of claim 14, wherein the first and second pluralities of molecules are pre-mixed and introduced as a bolus of fluid.

16. (canceled)

17. (currently amended) The method of claim 11, wherein the dispersion of the at least one of the first plurality of molecules and the second plurality of molecules is measured by detecting the concentration of the at least one of the first plurality of molecules and the second plurality of molecules.

18. (original) The method of claim 17, wherein the detection is by fluorescence, absorbance spectroscopy, thermal lens spectroscopy, or UV spectroscopy.

19. (withdrawn) The method of claim 17, wherein the detection is by mass spectroscopy, an electrochemical technique, a magnetic resonance technique, or radioactive technique.

20. (currently amended) The method of claim 11, wherein the dispersion of the first plurality of molecules in contact with the second plurality of molecules is compared to the dispersion of the first plurality of molecules flowing in the microfluidic conduit in the absence of the second plurality of molecules.

10/634,742 filed 08/04/2003

Spaid et al.

Reply to Office Action of 08/16/2006

21. (currently amended) The method of claim 11, wherein the dispersion of the second plurality of molecules in contact with the first plurality of molecules is compared to the dispersion of the second plurality of molecules flowing in the microfluidic conduit in the absence of the first plurality of molecules.

22. (currently amended) The method of claim 11, wherein a diffusivity ratio of ~~two~~ the first plurality of molecules and the second of the plurality of molecules is at least about 2.

23. (original) The method of claim 22, wherein the diffusivity ratio is about 8–10.

24. (original) The method of claim 22, wherein the diffusivity ratio is greater than 10.

25. (original) The method of claim 11, wherein the interaction is an associative interaction.

26. (withdrawn) The method of claim 11, wherein the interaction is a dissociative interaction.

27. (canceled)

28. (canceled)

29. (canceled)

30. (currently amended) The method of claim 11, further comprising introducing one or more additional pluralities of molecules into the microfluidic conduit, and measuring the dispersion of the one or more additional pluralities of molecules flowing in the conduit.

31. (original) The method of claim 11, wherein measuring the dispersion comprises measuring longitudinal dispersion in the axis of flow.

10/634,742 filed 08/04/2003

Spaid et al.

Reply to Office Action of 08/16/2006

32. (currently amended) The method of claim 11, wherein the first and second pluralities of molecules do not flow in side-by-side streams.

33-50 (canceled)

51. (new) A method for determining an interaction between a first plurality of molecules and a second plurality of molecules, comprising:

- (a) introducing a first plurality of molecules into a microfluidic conduit, the first plurality of molecules comprising a ligand;
- (b) introducing a second plurality of molecules into the microfluidic conduit such that the second plurality of molecules contacts the first plurality of molecules, the second plurality of molecules comprising a receptor;
- (c) measuring the dispersion of at least one of the first plurality of molecules and the second plurality of molecules flowing in the microfluidic conduit under pressure-driven flow conditions; and
- (d) determining an interaction between the first plurality of molecules and the second plurality of molecules based on the dispersion measurement.

52. (new) The method of claim 51, wherein one of the first plurality of molecules and the second plurality of molecules is introduced into the microfluidic conduit in a continuous stream of fluid.

53. (new) The method of claim 51, wherein one of the first plurality of molecules and the second plurality of molecules is introduced into the microfluidic conduit in a bolus of fluid.

54. (new) The method of claim 51, wherein the first and second pluralities of molecules are introduced simultaneously.

55. (new) The method of claim 54, wherein the first and second pluralities of molecules are premixed and introduced as a bolus of fluid.

10/634,742 filed 08/04/2003

Spaid et al.

Reply to Office Action of 08/16/2006

56. (new) The method of claim 51, wherein the dispersion of the at least one of the first plurality of molecules and the second plurality of molecules is measured by detecting the concentration of the at least one of the first plurality of molecules and the second plurality of molecules.

57. (new) The method of claim 51, wherein the dispersion of the first plurality of molecules in contact with the second plurality of molecules is compared to the dispersion of the first plurality of molecules flowing in the microfluidic conduit in the absence of the second plurality of molecules.

58. (new) The method of claim 51, wherein the dispersion of the second plurality of molecules in contact with the first plurality of molecules is compared to the dispersion of the second plurality of molecules flowing in the microfluidic conduit in the absence of the first plurality of molecules.

59. (new) The method of claim 51, wherein a diffusivity ratio of the first plurality of molecules and the second the plurality of molecules is at least 2.

60. (new) The method of claim 62, wherein the diffusivity ratio is about 8-10.

61. (new) The method of claim 62, wherein the diffusivity ratio is greater than 10.

62. (new) The method of claim 51, further comprising introducing one or more additional pluralities of molecules into the microfluidic conduit, and measuring the dispersion of the one or more additional pluralities of molecules flowing in the conduit.

63. (new) The method of claim 51, wherein measuring the dispersion comprises measuring longitudinal dispersion in the axis of flow.

10/634,742 filed 08/04/2003

Spaid et al.

Reply to Office Action of 08/16/2006

64. (new) The method of claim 51, wherein the first and second pluralities of molecules do not flow in side-by-side streams.

65. (new) A method for determining an interaction between a first plurality of molecules and a second plurality of molecules, comprising:

- (a) using pressure to flow a mixture of a first plurality of molecules and a second plurality of molecules in a fluidic conduit, the first plurality of molecules comprising an enzyme, and the second plurality of molecules comprising a substrate;
- (b) measuring the dispersion of at least one of the first plurality of molecules and the second plurality of molecules, and
- (c) determining an interaction between the first plurality of molecules and the second plurality of molecules based on the dispersion measurement.

66. (new) The method of claim 65, wherein the dispersion of the at least one of the first plurality of molecules and the second plurality of molecules in the mixture is compared with the dispersion of each of the first plurality of molecules and the second plurality of molecules in the absence of the other plurality of molecules.

67. (new) The method of claim 65, wherein the dispersion is measured by detecting the concentration of at least one of the first plurality of molecules and the second plurality of molecules in the fluidic conduit.

68. (new) The method of claim 67, wherein the first and second pluralities of molecules are not labeled for detection.

69. (currently amended) The method of claim 1, wherein a diffusivity ratio of the first plurality of the molecules and the second plurality of molecules is at least 2.